

RECLAMATION

Managing Water in the West

Draft Environmental Assessment

2008 Approval of One-Year Temporary Warren Act Contracts for the Conveyance of Non-CVP Water in the Delta-Mendota Canal

EA-07-108



U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South Central California Area Office
Fresno, California

December 2007

This page left blank intentionally.

Contents

Section 1	Purpose and Need for Action.....	1
1.1	Background.....	1
1.2	Purpose and Need.....	1
1.3	Scope.....	1
1.4	Applicable Regulatory Requirements and Required Coordination.....	2
1.5	Potential Issues.....	7
Section 2	Alternatives Including Proposed Action.....	9
2.1	Alternative A – No Action.....	9
2.2	Alternative B - Proposed Action.....	9
Section 3	Affected Environment & Environmental Consequences.....	12
3.1	Water Resources.....	12
3.2	CVP Facilities.....	14
3.3	Land Use.....	15
3.4	Biological Resources.....	19
3.5	Cultural Resources.....	30
3.6	Indian Trust Assets.....	31
3.7	Socioeconomic Resources.....	32
3.8	Environmental Justice.....	33
3.9	Cumulative Impacts.....	34
Section 4	Consultation and Coordination.....	35
4.1	Fish and Wildlife Coordination Act (16 USC, 651 et seq.).....	35
4.2	Endangered Species Act (16 USC, 1521 et seq.).....	35
4.3	National Historic Preservation Act (15 USC 470 et seq.).....	35
4.4	Migratory Bird Treaty Act (16 USC Sec. 703 et seq.).....	35
4.5	Executive Order 11988 – Floodplain Management and Executive Order 11990 - Protection of Wetlands.....	36
Section 6	List of Preparers and Reviewers.....	36
Section 7	References.....	36

List of Tables

Table 1-1	Water Quality Standards above Check 13.....	5
Table 1-2	Water Quality Standards Below Check 13.....	6
Table 3-1	Average Allocation of Contract Amounts.....	12
Table 3-2	List of Federal and State Listed Species that could occur in the Proposed Action Area	24
Figure 1-1	Map Showing Potential Districts that could Participate.....	8

List of Acronyms, Abbreviations, and Definition of Terms

AF	acre-feet (the volume of water one foot deep and an acre in area)
APE	area of potential effects
BCID	Banta-Carbona Irrigation District
BBID	Byron Bethany Irrigation District
cfs	cubic feet per second
CVO	Central Valley Operations Office
CVP	Central Valley Project
CVPIA	Central Valley Improvement Act
Districts	water service districts
DMC	Delta-Mendota Canal
DOI	Department of Interior
DPWD	Del Puerto Water District
DWR	California Department of Water Resources
EA	Environmental Assessment
ESA	Endangered Species Act
FWCA	Fish & Wildlife Coordination Act
MBTA	Migratory Bird Treaty Act
M&I	municipal and industrial
Mg/L	milligrams per liter
MSWD	Mercy Springs Water District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OLWD	Oro Loma Water District
Pacheco	Pacheco Water District
pCi/L	picocuries per liter
PWD	Panoche Water District
Reclamation	Bureau of Reclamation
Service	U.S. Fish and Wildlife Service
SLC	San Luis Canal
SLDMWA	San Luis & Delta-Mendota Water Authority
SLWD	San Luis Water District
SWP	California State Water Project
µg/L	micrograms per liter
µS/cm	microSiemens per centimeter

Section 1 Purpose and Need for Action

1.1 Background

The San Luis & Delta-Mendota Water Authority (SLDMWA), on behalf of its water service districts (Districts), has requested approval of one-year Warren Act Contracts for Contract Water Year 2008 (March 1, 2008 – February 28, 2009). Warren Act Contracts allow for the storage and conveyance of non-Central Valley Project water in the Bureau of Reclamation (Reclamation) owned Central Valley Project (CVP) facilities for irrigation purposes when excess capacity exists in CVP facilities. Conveyance of non-CVP water is limited to the availability of excess capacity in CVP facilities and water quality.

The Warren Act (Act as of February, 21, 1911, CH. 141, (36 STAT. 925)) authorizes Reclamation to negotiate agreements to store or convey non-CVP water when excess capacity is available in federal facilities. The action area of the Proposed Action consists of water districts in the Delta Division and San Luis Unit of the CVP in central California.

1.2 Purpose and Need

Reclamation is predicting another dry year in 2008. In addition, due to Federal Judge Oliver Wanger's Delta Smelt Interim Remedy Order, operation of the Federal Jones Pumping Plant will be limited and further reduce available CVP contract supplies. Participating CVP water service contractors of the SLMDWA will need additional water to supplement their 2008 Project water supply during a dry year shortage.

1.3 Scope

This environmental assessment (EA) has been prepared to examine the impacts on environmental resources as a result of conveying non-CVP water in federal facilities. The water would be delivered through the Delta-Mendota Canal (DMC) to water districts in the Delta Division and/or exchanged with CVP water and delivered through the San Luis Canal to the San Luis Units.

The following Districts are considered in the EA in the effects analysis and could potentially participate in this Proposed Action:

- Byron Bethany Irrigation District
- Banta Carbona Irrigation District
- Del Puerto Water District
- San Luis Water District
- Panoche Water District
- Pacheco Water District

- Oro Loma Water District
- Mercy Springs Water District

1.4 Applicable Regulatory Requirements and Required Coordination

Several Federal laws, permits, licenses and policy requirements have directed, limited or guided the NEPA analysis and decision making process of this EA and include the following:

- *Reclamation States Emergency Drought Relief Act* – Section 102 of the Reclamation States Emergency Drought Relief Act of 1991 provides for use of Federal facilities and contracts for temporary water supplies, storage and conveyance of non-CVP water inside and outside project service areas for municipal and industrial (M&I), fish and wildlife and agricultural uses.
- *San Joaquin County Groundwater Export Ordinance Number 401.4* - San Joaquin County has adopted an ordinance, 401.4 Section 5-8100 of Title 5 of the Ordinance Code of San Joaquin County, which requires a permit to extract and export groundwater for use outside of the county. This ordinance is hereby incorporated by reference into the Proposed Action.
- *Contracts for Additional Storage and Delivery of Water* – Central Valley Improvement Act (CVPIA) of 1992, Title 34 (of Public Law 102-575), Section 3408, Additional Authorities (c) authorizes the Secretary of the Interior to enter into contracts pursuant to Reclamation law and this title with any Federal agency California water user or water agency, State agency, or private nonprofit organization for the exchange, impoundment, storage, carriage, and delivery of Central Valley Project and non-project water for domestic, municipal, industrial, fish and wildlife, and any other beneficial purpose, except that nothing in this subsection shall be deemed to supersede the provisions of section 103 of Public Law 99-546 (100 Stat. 3051). The CVPIA is incorporated by reference.
- *Water Quality Standards* – Reclamation requires that the operation and maintenance of CVP facilities shall be performed in such manner as is practical to maintain the quality of raw water at the highest level that is reasonably attainable. Water quality and monitoring requirements are established by Reclamation to protect water quality in the DMC by ensuring that imported non-CVP water does not impair existing uses or negatively impact existing water quality conditions. These standards are updated periodically. The annual review for the approval of Warren Act Contracts would be subject to the then-existing water quality standards. The water quality standards are the maximum concentration of certain contaminants that may occur in each source of non-CVP water. Reclamation has established standards for non-CVP groundwater that may be pumped in the DMC above Check 13 (See Table 1-1), and in the DMC below Check 13 (See Table 1-2). Check 13, located near Santa

Nella, California (the intake to the O'Neill Forebay), is the dividing line between the upper and lower DMC.

**WATER QUALITY STANDARDS FOR ACCEPTANCE
OF GROUNDWATER INTO THE DELTA-MENDOTA CANAL**

Headworks to Check 13 (O'Neill Forebay)

Constituent	Units	Maximum Contaminant	
		Level	Source
Primary			
Aluminum	µg/L	1,000	(1)
Antimony	µg/L	6	(1)
Arsenic	µg/L	50	(1)
Barium	µg/L	1,000	(1)
Beryllium	µg/L	4	(1)
Boron	µg/L	700	(3)
Cadmium	µg/L	5	(1)
Chromium (total)	µg/L	50	(1)
Copper	µg/L	1,300	(1)
Lead	µg/L	15	(1)
Mercury (inorganic)	µg/L	2	(1)
Nickel	µg/L	100	(1)
Nitrates	µg/L	45	(1)
Selenium	µg/L	2	(2)
Thallium	µg/L	2	(1)
Secondary			
Chloride	µg/L	250	(1)
Iron	µg/L	300	(1)
Manganese	µg/L	50	(1)
Molybdenum	µg/L	10	(3)
Silver	µg/L	100	(1)
Sodium	µg/L	69,000	(3)
Specific Conductance	µS/cm	2,200	(1)
Sulfate	µg/L	250	(1)
TDS	µg/L	1,500	(1)
Zinc	µg/L	5,000	(1)
Radioactivity			
Gross Alpha	pCi/L	15	(1)
Organic Chemicals			
Atrazine	µg/L	1	(1)
Bentazon	µg/L	18	(1)
Carbofuran	µg/L	18	(1)
Chlordane	µg/L	0.1	(1)
Chlorpyrifos	µg/L	0.025	(2)
2, 4-D	µg/L	70	(1)

**WATER QUALITY STANDARDS FOR ACCEPTANCE
OF GROUNDWATER INTO THE DELTA-MENDOTA CANAL**

Headworks to Check 13 (O'Neill Forebay)

Constituent	Units	Maximum Contaminant	
		Level	Source
Diazinon	µg/L	0.016	(2)
Dibromochloropane (DBCP)	µg/L	0.2	(1)
Endrin	µg/L	2	(1)
Ethylene Dibromide (EDB)	µg/L	0.05	(1)
Glyphosate	µg/L	700	(1)
Heptachlor	µg/L	0.01	(1)
Heptachlor Epoxide	µg/L	0.01	(1)
Lindane	µg/L	0.2	(1)
Methoxychlor	µg/L	30	(1)
Molinate	µg/L	20	(1)
2, 4, 5-TP (Silvex)	µg/L	50	(1)
Simazine	µg/L	4	(1)
Thiobencarb	µg/L	70	(1)
Toxaphene	µg/L	3	(1)

Sources:

(1) Title 22. The Domestic Water Quality and Monitoring Regulations specified by the State of California Health and Safety Code (Sections 4010-4037), and Administrative Code (Sections 64401 et seq.), as amended.

(2) California Regional Water Quality Control Board, Central Valley Region, Fourth Edition of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins

(3) Ayers, R. S. and D. W. Westcot, *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).

revised 12/16/2007 SCC-107

Table 1-1 Water Quality Standards above Check 13

**WATER QUALITY STANDARDS FOR ACCEPTANCE
OF GROUNDWATER INTO THE DELTA-MENDOTA CANAL**

Check 13 (O'Neill Forebay) To Check 21 (Mendota Pool)

Constituent	Units	Maximum Contaminant	
		Level	Source
Boron	µg/L	700	(3)
Chromium, total	µg/L	50	(1)
Mercury	µg/L	2	(1)
Molybdenum	µg/L	10	(3)
Nickel	µg/L	100	(1)
Nitrates	µg/L	45	(1)
Selenium	µg/L	2	(2)
Specific Conductance	µS/cm	1,230	(4)
Total Dissolved Solids	mg/L	800	(4)
Chlorpyrifos	µg/L	0.025	(2)
Diazinon	µg/L	0.16	(2)

(1) Title 22. The Domestic Water Quality and Monitoring Regulations specified by the State of California and Safety Code (Sections 4010-4037), and Administrative Code (Sections 64401 et seq.), as amended.

(2) California Regional Water Quality Control Board, Central Valley Region, Fourth Edition of the Water Control Plan for the Sacramento River and San Joaquin River Basins

(3) Ayers, R. S. and D. W. Westcott, *Water Quality for Agriculture*, Food and Agriculture Organization of United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985).

(4) Second Amended Contract for Exchange of Waters, No IIr-1144, Article 9. Quality of Substitute Water

revised 12/16/2007 SCC-107

Table 1-2 Water Quality Standards Below Check 13

1.5 Potential Issues

- Water Resources
- CVP Facilities
- Land Use
- Biological Resources
- Cultural Resources
- Indian Trust Assets
- Socioeconomic Resources
- Environmental Justice

Delta-Mendota Canal 2008 Warren Act Contract

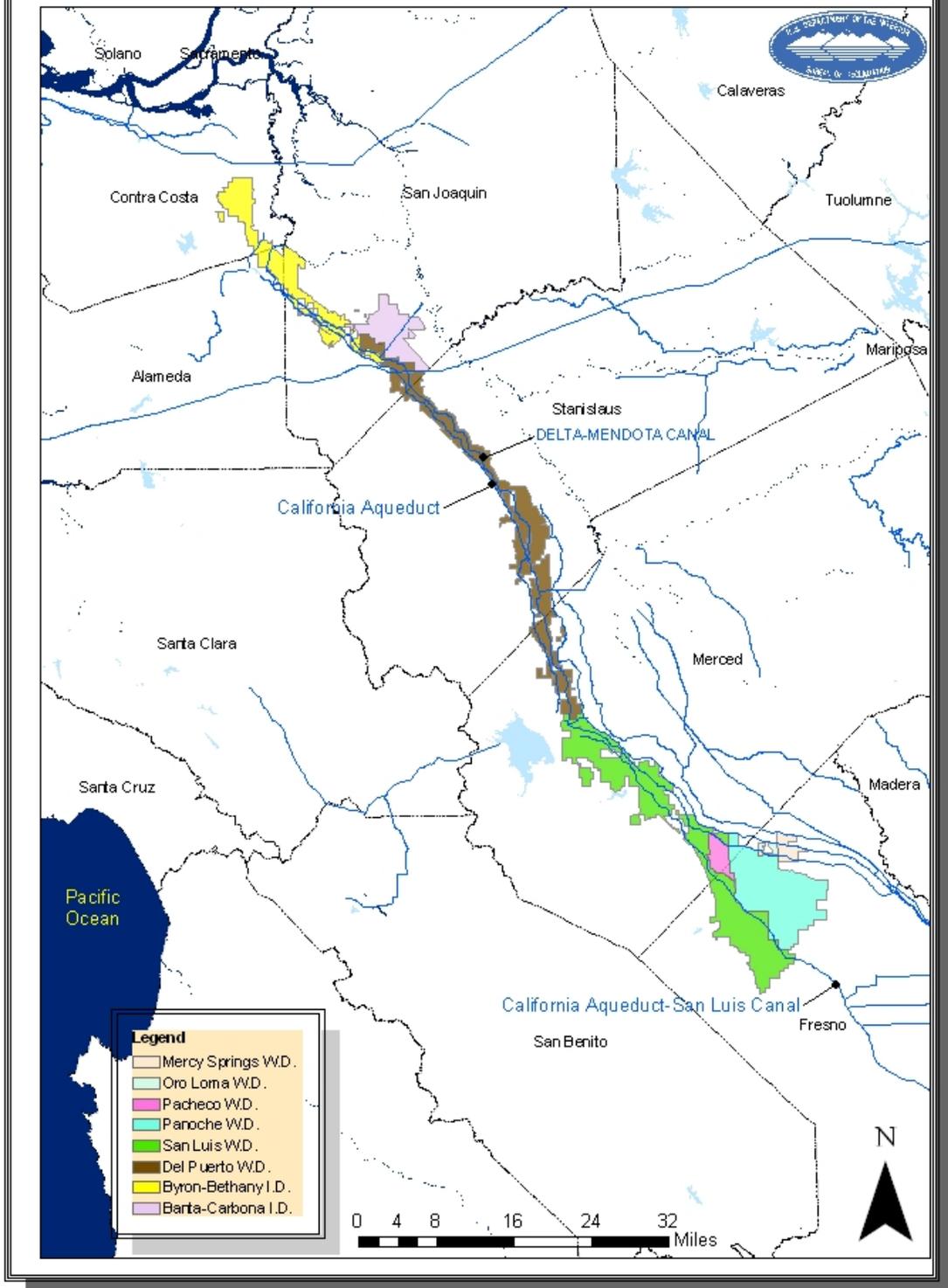


Figure 1-1 Map Showing Potential Districts that could Participate

Section 2 Alternatives Including Proposed Action

2.1 Alternative A – No Action

The No Action Alternative consists of the continuation of deliveries of CVP water supply in accordance with the terms and conditions of the applicable districts CVP water service contracts. Without the Proposed Action, SLDMWA could not use this water in its service area and would need to construct facilities to obtain this water. The construction of new facilities would duplicate a portion of the CVP facilities. SLDMWA could sell this water to willing buyers.

2.2 Alternative B - Proposed Action

Reclamation proposes to issue one-year temporary Warren Act Contracts to requesting CVP contractors within the Delta Division and San Luis Unit (limited to those listed below) for a combined total of up to 50,000 AF for the 2008 contract year ending February 28, 2009 for the delivery of non-CVP water in the DMC. Conveyance of non-CVP water under a Warren Act Contract would be subject to available capacity.

The source of non-CVP water would be District groundwater pumping. The Districts would pump groundwater from wells close to the DMC directly into the DMC. The amount of water pumped into the DMC would be measured by SLDMWA field staff. Participating Districts intend to pump up to 10,000 AF of groundwater into the DMC. The District would then take out a like amount from turnouts on the DMC to be conveyed through their distribution systems for agricultural use to water users within the District.

Three districts (San Luis, Pacheco, and Panoche Water Districts) are connected to both the DMC and San Luis Canal. Under the proposed contracts, groundwater would be pumped into the DMC which would be credited to each district and delivered from the DMC to satisfy other DMC demands and, in exchange, CVP water would be delivered to each district through the San Luis Canal. No groundwater would be pumped directly into the San Luis Canal under this Proposed Action.

Each district would be required to confirm that the proposed pumping of groundwater would be compatible with local groundwater management plans. Each district would be limited to pumping a quantity below the “safe yield” as established in the groundwater management plan, in order to prevent groundwater overdraft and avoid adverse impacts. Well water must be tested prior to introduction into the canal to ensure compliance with water quality standards specified in Tables 1-1 or 1-2. Subsequent testing of the well water would be made at various times to

maintain water quality in the canal. The water would only be used for irrigation purpose on established lands.

The following is a list of the Delta Division water districts who could potentially participate in this Proposed Action:

- Banta-Carbona Irrigation District
- Byron Bethany Irrigation District
- Del Puerto Water District
- Oro Loma Water District
- Mercy Springs Water District

The following are the San Luis Unit water districts who could potentially participate in this Proposed Action:

- Pacheco Water District
- Panoche Water district
- San Luis Water District

Additionally, the above referenced South of Delta CVP contractors that would enter into a Warren Act Contract request the flexibility to transfer some of the groundwater that is pumped into the DMC to other South of Delta CVP contractors. It is not known at this time which contractors would be involved in the subject transfers, if any. However, Panoche Water District (PWD), in recent years, primarily due to chronic shortages in contract allocations, has actively participated in water transfers with other SLDMWA contractors including Oro Loma, Mercy Springs, Westlands, Widren, Banta-Carbona, and San Luis Water Districts, as well as in transfer and banking projects involving other types of contractors (Reclamation 2005b).

Transferred water application would not affect the presence of threatened or endangered species. Grasslands and shrub land that have never been tilled or irrigated would not be tilled and put into production using this water acquired via transfer. Land that has been fallowed, idled, and not cultivated on a temporary basis (less than three consecutive years) and rotated back into production is not considered conversion of a native habitat.

Water quality and monitoring requirements are established by Reclamation. These standards were established to protect water quality in federal facilities by ensuring that imported water does not impair existing uses or negatively impact existing water quality conditions.

The effects of the non-CVP water in the DMC will be monitored to ensure Reclamation meets CVP water quality standards identified in Tables 1-1 and 1-2 above. Reclamation staff will

monitor the salinity of water in the DMC using sensors operated by Central Valley Operations Office (CVO). This real-time data are posted online by the California Data Exchange Center. Staff from Reclamation, CVO, and SLDMWA will monitor salinity in the canal daily to detect any adverse changes in water quality caused by the addition of the non-CVP water. The Warren Act Contract provides for additional analyses of each well as needed, and allows the Contracting Officer to shut down wells that cause water quality problems.

If salinity in the canal increases due to the non-CVP water, Reclamation staff will work with the SLDMWA and each District to modify or restrict the operation of wells to improve water quality.

The Proposed Action would not involve the conversion of any land fallowed and untilled for three or more years.

Section 3 Affected Environment & Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

For the purposes of the effect analysis, baseline conditions are described as the existing environment, and the existing environment is defined as the conditions during the past five years. The five-year average allocation of CVP water supplies delivered to the water contractors is described in Table 3-1. It lists maximum deliveries of CVP water on a yearly basis for agriculture purposes from 2003 to 2007. The five-year average is 76 percent of contract amounts for agriculture. The annual contract amounts for the Districts is 1,800,000 AF, thus the baseline supply is 1,368,000 AF.

Table 3-1 Average Allocation of Contract Amounts

5-YEAR CVP ALLOCATION PERCENTAGES	
Year	Percent Ag Allocation
2003	75
2004	70
2005	85
2006	100
2007	50
5-Year Average	76

As a result of the expected dry year, the 2008 water allocation for agricultural South of Delta contractors can be as low as 25 percent. A refined allocations determination will be made in February and adjustments will continue to be made as the contract year progresses and the hydrology and pumping capabilities dictate.

The southern two-thirds of the Central Valley regional aquifer system, which covers over 13,000 square miles extending from just south of the Delta to just south of Bakersfield, is referred to as the San Joaquin Valley Basin (DWR 1975). An impermeable clay referred to as the Corcoran Clay Member underlies much of the western portion of this area. It divides the groundwater system into two major aquifers: a confined aquifer below the clay and a semi-confined aquifer above the clay. Aquifer recharge to the semi-confined upper aquifer historically occurred from stream seepage, deep percolation of rainfall, and subsurface inflow along basin boundaries. With the introduction of irrigated agriculture into the region, recharge was augmented with deep percolation of applied agricultural water and seepage from the CVP distribution systems. Recharge of the lower confined aquifer results from the subsurface inflow from the valley floor and foothill areas to the east of the eastern boundary of the Corcoran Clay Member.

Groundwater quality conditions vary throughout the San Joaquin River Region. Salinity (expressed as total dissolved solids), boron, nitrates, arsenic, selenium, and mercury are parameters of concern for agricultural and municipal uses throughout the region. Of particular concern on the west side are total dissolved solids and selenium.

Groundwater zones commonly used along a portion of the western margin of the San Joaquin Valley have high concentrations of total dissolved solids, ranging from 500 milligrams per liter (mg/L) to greater than 2,000 mg/L (Bertoldi et al. 1991). The concentrations in excess of 2,000 mg/L commonly occur above the Corcoran Clay layer. These high levels have impaired groundwater for irrigation and municipal uses in the western portion of the San Joaquin Valley.

High selenium concentrations in soils of the west side of the San Joaquin River region are of great concern because of their potential to leach from the soil by subsurface irrigation return flow into the groundwater and into receiving surface waters. Selenium concentrations in shallow groundwater along the west side have been highest in the central and southern area south of Los Banos and Mendota with median concentrations of 10,000 to 11,000 micrograms per liter (Bertoldi et al. 1991).

Pumping, largely for crop irrigation has substantially affected groundwater in the San Joaquin Valley. Pumping has caused subsidence which has caused depressions to form and has altered regional groundwater flow patterns, recharge, and discharge. Annual groundwater pumping in the San Joaquin River region exceeds recent estimates of perennial yield by approximately 200,000 AF. All of the sub-basins within the San Joaquin River region have experienced some overdraft (DWR 2003).

3.1.2 Environmental Consequences

No Action

Under the No Action Alternative, no Warren Act Contracts would be issued to any San Luis Unit or Delta Division contractor. Therefore, no additional groundwater would be pumped beyond what the land owner would pump for their own need.

Proposed Action

The total quantity of groundwater that can be pumped into the DMC under the Proposed Action would be 50,000 AF, and that quantity would be divided among the San Luis Unit contractors and the Delta Division contractors. However, each district would be limited to pumping a quantity below the "safe yield" as established in the groundwater management plan, in order to prevent groundwater overdraft and avoid adverse impacts. Safe yield is defined as the amount of groundwater that can be continuously withdrawn from a basin without adverse impact. The amount of water pumped into the DMC would be credited to that district. Meaning, the quantity of groundwater pumped into the DMC would be delivered back into the district and used for

irrigation purposes throughout the originating district. South of Delta CVP contractors that would enter into Warren Act Contracts would also have the flexibility to transfer some of the groundwater that is pumped into the DMC to other South of Delta CVP contractors. It is not known at this time which contractors would be involved in the subject transfers, if any. Though some of the water used for irrigation would be used up by evapotranspiration and evaporation, some would also seep back into the ground. The Proposed Action is a way to get the groundwater into the district's distribution system for the benefit of all water users within the district's boundaries.

Additionally, water in each well must meet water quality standards prior to approval for conveyance, and the monitoring of groundwater quality would continue throughout the irrigation season. If a well to be used for pumping water into the DMC does not meet the water quality standards, the District could not pump water from that well into the DMC under the Warren Act Contract. The Warren Act Contract provides for routine testing of each well by Reclamation and SLDMWA to confirm that the groundwater still meets standards. The contract also allows the Contracting Officer to stop a well that fails to meet standards. Reclamation and SLDMWA staff will monitor salinity in the canal to identify degradation caused by the groundwater, and will work with the SLDMWA and districts to modify or restrict pumping to improve water quality.

3.2 CVP Facilities

3.2.1 Affected Environment

The DMC, the second largest of the CVP waterways, was completed in 1951. It includes a combination of both concrete-lined and earth-lined sections and is about 117 miles in length. It carries water southeasterly from the Jones Pumping Plant, located near Tracy, California, into the DMC along the west side of the San Joaquin Valley for distribution to refuges, irrigation districts, and cities. The canal transports water to the Mendota Pool. The DMC is divided into the upper and lower portions. The dividing point is Check 13 near Santa Nella, California. Check 13 is the intake to the O'Neill Forebay and San Luis Reservoir which are connected to the California State Water Project (SWP). Capacity in the DMC is restricted by the physical limitations of the canal and the pumping limits of the Tracy Pumping Plant (Reclamation 2007). The Mendota Pool is the terminus for the DMC (Check 21) and is located at the confluence of the San Joaquin River and the North Fork of the Kings River, approximately 50 miles west of the City of Fresno. (The Mendota Pool is not owned nor operated by Reclamation.)

The DMC provides for the transport of water through the central portion of California's Central Valley and acts as a hub around which the CVP and SWP revolve. The DMC is part of the Delta Division facilities of the CVP. The Delta Division facilities transfer water from the Sacramento River to bolster irrigation supplies to lands formerly dependent on water from the San Joaquin River or groundwater. The facilities also provide for the transport of water through both the

Sacramento-San Joaquin River and the San Francisco Bay-Delta Estuary and for the delivery of water to CVP and SWP contractors in the San Joaquin Valley and Southern California SWP contractors (Reclamation 2007).

3.2.2 Environmental Consequences

No Action

The DMC would continue to be used to provide CVP water to CVP contractors. Under the No Action Alternative, there would be no change to the existing conditions described above.

Proposed Action

The Proposed Action would allow efficient delivery of the Districts' groundwater in dry years when demand is high. No new facilities would be needed as a result of the Proposed Action. There would be no construction or modification to the DMC. The capacity of the facility would remain the same. The Proposed Action would not interfere with the normal operations of DMC nor would it impede any SWP or CVP obligations to deliver water to other contractors or to local fish and wildlife habitat. Furthermore, the Proposed Action would not interfere in the quantity or timing of diversions from the Sacramento-San Joaquin Bay Delta. Project operations and facilities would not vary considerably under either alternative.

3.3 Land Use

3.3.1 Affected Environment

Banta-Carbona Irrigation District

Banta-Carbona Irrigation District (BCID) is entirely an agricultural district and does not supply or intend to supply any water for M&I use. BCID extends from the City of Tracy to the San Joaquin-Stanislaus County line near the town of Vernalis. BCID's current size is 14,000 acres and its water needs are 47,000 AF. The major crops are field crops.

As the City of Tracy and the Interstate 5 corridor continue to grow, attachments and detachments would continue. Also, new areas that may require water for M&I purposes would be detached from the district. Currently, a few parcels within the district are targeted for detachment and would be annexed to the City of Tracy. This detachment process has been on-going in the district. Whenever a new urban expansion is planned, the land is automatically deleted from district boundaries. BCID has assigned 5,000 AF/y through an assignment of its CVP supply to the City of Tracy. Therefore, while vulnerable to development pressures along the Interstate 5 corridor, BCID is expected to remain an entirely agricultural district.

The district was considered built-out in 1968 following underground pipeline completion made possible with funds from a PL 84-984 federal assistance loan. As the City of Tracy continues to expand, some of these existing facilities will be abandoned. Currently, some portions of the

district's distribution system remain unused. When an area is detached from the district, the water that was used to serve the land remains with the district.

There are about 600 to 700 landowners in the district; however, there are only with 60 to 70 water customers since not all landowners farm their land. Some lease their land to others who farm larger areas. Major crops being produced within the district include both row crops (cannery tomatoes, dry beans, alfalfa, and a small quantity of melons) and permanent crops (primarily almond, with smaller amounts of walnuts, apricots, peaches, and apples). Also, some areas have been planted with grapes over the last few years. Irrigation methods include furrow, open ditch or border flooding, and siphon pipe on row crops and sprinklers on permanent crops.

Byron Bethany Irrigation District

Byron Bethany Irrigation District (BBID) is primarily agricultural. BBID's current size is 2,700 acres and its water needs are 10,000 AF. Its major crops are pasture. In 1990, a small portion of the district's CVP supply was allocated for M&I use to service commercial and residential development. The water provided by the BBID was treated and delivered by the City of Tracy. Since 1990, approximately 500 acres of land have been converted to M&I use. By 2005, a portion of Tracy Hills was annexed into BBID (City of Tracy 2007).

The water allocated for converted land will continue to be used to serve the new land use through the City of Tracy water supply system. It is possible that as Tracy continues to grow, the amount of CVP water used for M&I purposes could increase. It is also possible that the anticipated growth could result in some areas currently within the district being detached and annexed by the City of Tracy. Byron Bethany Irrigation District has informed Reclamation of its plan to transfer a portion of its CVP supply to the City of Tracy by 2025.

Row crops produced within the district are primarily alfalfa. Permanent crops include almond and cherries. There is also some dry farming in the district. Typical irrigation methods include primarily furrow and border irrigation and sprinklers.

Del Puerto Water District

Del Puerto Water District (DPWD) is primarily an agricultural district. DPWD irrigates 40,000 acres and its water needs are 131,000 AF. Currently, the only CVP supply used for M&I purposes is the one acre-foot of water supplied to the city landfill each month for dust suppression. All remaining CVP supplies are used for agriculture.

Despite the urban sprawl in the area resulting from the growth of Patterson and Tracy and along the Interstate 5 corridor, DPWD would like to continue to remain primarily an agricultural district. DPWD does not intend to increase the amount of CVP water used for M&I purposes.

There are about 170 water users in the district. More than 30 different crops have been grown commercially in the district over the years. Principal crops grown include row crops (cannery tomatoes, alfalfa, large limas, and dry beans). However, almost one-half of the agricultural production in the district is permanent crops (almonds, apricots, and walnuts). Typical irrigation methods in the district include primarily furrow irrigation for row crops and sprinkler, sprinkler with less frequent use of drip, and micro-misters for permanent crops. Historically, areas of the district have remained fallow during the growing season (Reclamation 2005).

Oro Loma Water District

Located in northwestern Fresno County, Oro Loma Water District (OLWD) participates in the agricultural economy of the western San Joaquin Valley. OLWD's current size is 1,095 acres (gross). Fresno County is second in the nation in the value of its agricultural production behind only neighboring Tulare County. On the west side of the valley, this has been made possible by the delivery of irrigation water from the Sacramento-San Joaquin Delta via CVP and other water agencies' facilities.

Oro Loma Water District is entirely an agricultural district with only one landowner. Because it is located in a rural area away from major development pressures, the conversion from agricultural to M&I uses is unlikely. The crops typically produced in the district include rice, and historically, some of the land has also been farmed with cotton (Reclamation 2005).

Mercy Springs Water District

Mercy Springs Water District (MSWD) is entirely an agricultural district. MSWD's current size is 3,618 acres (gross). Because it is located in a rural area away from major development pressures, the conversion from agricultural to M&I uses is unlikely. The crops typically produced in the district include cotton and alfalfa. All administrative functions for the district are currently being provided by PWD. Also, most of the district has been acquired by the Panoche Drainage District for use as a regional drainage management facility on which subsurface drain water is applied to salt-tolerant crops. The CVP contract supply for this area has been assigned to Westlands Water District. Administrative functions for MSWD are performed by PWD (Reclamation 2005).

Pacheco Water District

The Pacheco Water District's (Pacheco) current size is 4,000 total acres. Pacheco was formed in 1953 for the purpose of obtaining a CVP water supply. Pacheco entered into a long-term contract with Reclamation for 10,080 AF of water supply from the DMC and SLC. Pacheco's agricultural demand is 11,000 AF. Pacheco's CVP supply is their primary water supply though the District also has a surface water supply from the Central California Irrigation District. The District also owns one groundwater well but does not pump groundwater due to the poor quality of the underlying groundwater.

Panoche Water District

PWD began receiving its first CVP supply water from the Friant Dam of the San Joaquin River in 1947 under an interim contract. On August 16, 1955, the PWD entered into a long-term water service contract with Reclamation. This contract provided for the delivery to the PWD of 93,988 AF of water per year from the DMC. PWD's agricultural demands are 106,772 AF. The contract service area is approximately 35,000 acres. The major crops are field crops.

When the PWD's contract with Reclamation became effective, most crops and land developments came to rely on better quality surface water rather than groundwater. The surface water supply was to supplement the groundwater being used. With the exception of drought conditions, almost no groundwater has been utilized in the Panoche.

There are approximately 300 full-time residents living in the PWD service area. This population is comprised primarily of farm labor residents working on adjacent farms. This population has remained virtually the same for over 10 years and is not anticipated to grow due to any non-farming circumstances. PWD supplies about 50 AF of water per year for M&I purposes. PWD does not have any industrial use customers. There is some domestic use which is incidental to agriculture.

San Luis Water District

On February 25, 1959, San Luis Water District (SLWD) entered into a long-term water service contract with Reclamation and a subsequent amendatory contract on June 18, 1974, which has an annual allocation of CVP water of up to 125,080. The SLWD is located on the western side of the San Joaquin Valley near Los Banos. SLWD's current size is approximately 40,000 acres, and its water needs are 120,000 AF. The major crops are tree crops. The current population within SLWD is approximately 700.

3.3.2 Environmental Consequences

No Action

Under the No Action Alternative, no Warren Act Contracts would be issued. Reclamation anticipates a dry year. In the dry year, there could be some adverse impacts to crops if supplemental supplies of water are not found. Districts could purchase other sources of water or construct new facilities.

Proposed Action

Under the Proposed Action, the districts would supplement their CVP water supply with groundwater to meet demand for existing crops. No new lands would be cultivated with this water. The conveyance of the non-CVP water through CVP facilities would not contribute to changes in land use. It would be conveyed in existing facilities and canals. The Proposed

Action does not increase or decrease water supplies that would result in additional homes to be constructed and served. The approval to be covered under this EA will be for one year and will be limited to use of this non-CVP water with no resulting land use changes.

3.4 Biological Resources

3.4.1 Affected Environment

Vegetation Types and Wildlife Habitat

The habitats associated with the study area include non-native grassland, agricultural, valley foothill riparian, alkali desert scrub, ruderal, and fresh emergent wetlands. The following discussion describes vegetation types, plants, and animals located in and adjacent to the project area. The districts fall in and overlap the following counties: Fresno, Merced, Stanislaus and San Joaquin Counties.

Non-native Grassland Since settlement of the lands of the study area by the Europeans, perennial bunch grasses that once dominated the region have largely been replaced by annuals, whose seeds arrived in livestock feed and in the fur of imported animals. Today, grasses that comprise this habitat include wild oat (*Avena sativa*), medusa head (*Teinatherum caput-medusae*), ripgut (*Bromus diandrus*), soft chess (*Bromus hordeaceus*) and Mediterranean barley (*Hordeum marinum* ssp. *gussonianum*). Common forbs included common bindweed (*Convolvulus arvensis*), red-stemmed filaree (*Erodium cicutarium*), yellow star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*). Low lying areas that typically pond water during heavy rainstorms, and for a short time thereafter may include fiddle dock (*Rumex pulcher*) and curly dock (*Rumex crispus*). In addition, a considerable number of native spring-flowering forbs occur during winters of average to above average rainfall. These typically include Eastwood's fiddleneck (*Amsinckia eastwoodia*), baby blue-eyes (*Nemophila menziesii*), red maids (*Calandrinia ciliate*), fringe-pod (*Thysanocarpus curvipes*), and other native forbs.

Non-native grassland provides important habitat to many terrestrial vertebrates. Grassland habitat values of the study area vary. Most grasslands under private ownership possess low intrinsic value to native wildlife compared to original conditions; however, those that are lightly grazed may in fact exhibit a relatively high level of terrestrial vertebrate species richness and abundance. The highest quality grassland habitats for wildlife typically occur on the wildlife refuges, where lands are managed to support native species such as tule elk (*Cervus nannodes*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), and San Joaquin kit fox (*Vulpes macrotus mutica*).

Common species of reptiles and amphibians in the non-native grassland habitats include western fence lizards (*Sceloporus occidentalis*), southern alligator lizards, and gopher snakes (*Pituophis melanoleucus*). The latter two typically forage for small mammals. Resident and migratory birds forage and reproduce in non-native grassland habitats. Resident songbirds include the western

meadowlark (*Sturnella neglecta*) and the mourning dove (*Zeniada macroura*). Western king birds (*Tyrannus verticalis*) are commonly seen foraging from fences and utility lines during spring and summer. Savannah sparrows (*Passerculus sandwichensis*) and western meadowlarks may build their nests directly on the ground. Seeds produced by annual grasses also provide food for migrating and wintering songbirds, such as lesser goldfinches (*Carduelis psaltria*) and white-crowned sparrows (*Zonotrichia leucophrys*). American crows (*Corvus brachyrhynchos*) and European starlings (*Sturnus vulgaris*) forage in grasslands and are among the most conspicuous of the songbirds.

Diurnally active raptors that forage in grassland habitats include the red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks (*B. lineatus*), Swainson's hawks (*B. swainsonii*), ferruginous hawks (*B. regalis*), black-shouldered kites (*Elanus leucurus*), northern harriers (*Circus cyaneus*), and American kestrels (*Falco sparverius*). Nocturnally active raptors include barn owls (*Tyto alba*), short-eared owls (*Asio flammeus*), and burrowing owls (*Athene cunicularia*), which seek cover in abandoned ground squirrel burrows and often perch conspicuously at the entrance to their burrows during the day.

Small mammals include Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), and black-tailed hare (*Lepus californicus*). The California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), and ornate shrew (*Sorex ornatus*) are common residents. These small mammals attract a variety of predators, including various snakes and raptors as previously discussed, and also mammals. Coyotes (*Canis latrans*), red foxes (*V. vulpes*), and badgers (*Taxidea taxus*) are also common mammalian predators of non-native grasslands. The San Joaquin kit fox also forages in this habitat and modifies the burrows of California ground squirrels for denning.

Several bat species forage over grassland habitats in the region, chiefly for flying insects. These include, but are not limited to Brazilian free-tailed bats (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), Townsend's western big-eared bat (*Plecotus townsendii townsendii*), and spotted bat (*Euderma maculata*). Pallid bat (*Antrozous pallidus*) also forages over grasslands in the region for hard-shelled insects including Jerusalem crickets, which it picks up from the ground.

Alkali Desert Scrub Alkali desert scrub is generally characterized by a dominance of chenopods (members of the Chenopodiaceae family) or other halophytes, and exists in two distinct phases: xerophytic (drought-tolerant plants) and halophytic (salt-tolerant plants). In the study area, alkali desert scrub plant communities occur at low elevations in the western San Joaquin Valley.

The xerophytic phase is represented by open stands of widely spaced, low (0.8 foot) to

moderately high (7 feet) grayish, spiny, and small-leaved shrubs and subshrubs. Allscale (*Atriplex polycarpa*), fourwing saltbush (*A. canescens*), Parry saltbush (*A. parryi*), shadscale (*A. canescens*), and big saltbush (*A. lentiformis*) are common shrubby saltbush species of this phase. Other important shrubs include bud sagebrush (*Picrothammus desertorum*), Mexican tea (*Chenopodium ambrosoides*), Fremont dalea (*Psorothamnus fremontii*), and creosote bush (*Larrea tridentata*). Cheesebush (*Hymenoclea salsola*), alkali goldenbush (*Isocoma acradenia*), and honeysweet tidestromia (*Tidestromia oblongifolia*) are common subshrubs in this phase. Forbs and grasses that characterize this phase include Torrey blazing star (*Mentzelia torreyi*), kidney-leaved buckwheat (*Eriogonum reniforme*), and apricot globemallow (*Sphaeroclea ambigua ssp. ambigua*).

Closely spaced, not very woody, and more or less succulent plants that tolerate periodic flooding characterize the halophytic phase. This phase generally does not exceed a height of 3.3 feet. Common shrub and subshrubs found in this phase include arrow weed (*Pleurocoronis pluriseta*), greasewood (*Sarcobatus vermiculatus*), alkali goldenbush (*Isocoma acradenia*), kochia (*Kochia californica*), iodine bush (*Allenrolfea occidentalis*), and alkali rubber rabbitbrush (*Chrysothamnus nauseosus*). Common forbs and grasses are alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), alkali heliotrope (*Heliotropium curassavicus*), arrow-grass (*Triglochin concinna*), yerba mansa (*Anemopsis californica*), and alkali sacaton (*Sporobolus airoides*).

Reptiles, such as side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis sp.*), and western rattlesnake (*Crotalus viridis*), are commonly observed in alkali desert scrub habitat.

Common birds that forage or nest in alkali desert scrub include greater roadrunner (*Geococcyx californianus*), mourning dove, blue-gray gnatcatcher (*Polioptila caerulea*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Carpodacus mexicanus*), American goldfinch (*Carduelis tristis*), and lesser goldfinch.

Common mammals include Botta's pocket gopher, California ground squirrel, desert cottontail (*Sylvilagus auduboni*), deer mouse (*Peromyscus maniculatis*), California vole, Herman's kangaroo rat (*Dipodomys heermanni*), black-tailed hare, striped skunk, badger, and coyote. A number of bats also forage in this environment including Yuma myotis (*Myotis yumanensis*), spotted bat, California myotis, and Townsend's western big-eared bat.

Agricultural Habitats Agricultural communities within the study area are very diversified and almost half of the irrigated acreage in the San Joaquin region is planted with grains, hay, and

pasture. Orchards are planted on about 30 percent of the irrigated acres; cotton and vegetables are each planted on about 10 percent.

Many of the natural habitats in the Central Valley have been largely replaced by agricultural habitats. Six agricultural types were identified in the project area: pasture, orchard-vineyard, row crops, and cotton. The intensive management of agricultural lands, including disking, grazing, crop rotation, and the use of chemicals, has significantly reduced the value of these habitats for wildlife. However, many wildlife species have adapted to particular crop types and now use them for foraging and nesting. Compared to other agricultural crops, rice and grain crops are considered of high value for wildlife because waste grain is important to foraging wildlife species and flooded rice fields provide habitat similar to some natural wetlands. Compared to rice and grains, pasture and row crops provide moderate-quality habitat because of their limited cover and foraging opportunities. Orchard-vineyard and cotton crops generally provide low-quality wildlife habitat because of frequent disturbance resulting in limited foraging opportunities and lack of cover. However, orchards are slightly more valuable for kit foxes.

Pasture Pasture habitat consists of irrigated and unirrigated lands dominated by grasses and legumes. The vegetation composition of pastures varies with management practices, affecting the abundance and composition of wildlife. Irrigated pastures provide foraging and roosting opportunities for many shorebirds and wading birds, including black-bellied plover (*Pluvialis squatarola*), killdeer (*Charadrius vociferous*), long-billed curlew (*Numenius americanus*), and white-faced ibis (*Plegadis chihi*). Lightly grazed, unirrigated pasture provides forage for seed-eating birds and small mammals when the seeds ripen. Alfalfa grown in irrigated pastures provides high-quality foraging habitat for rodents. Ground nesting birds, such as ring-necked pheasant (*Phasianus colchicus*), various waterfowl (*Anas sp.*), and western meadowlark (*Sturnella neglecta*), occupy pasture habitat if adequate residual vegetation is present.

Small mammals occupying pasture habitat include California voles, Botta's pocket gophers, and California ground squirrels. They in turn provide forage for such raptors as red-tailed hawks, black-shouldered kites, and prairie falcons (*F. mexicanus*) among others, as well as mammalian predators such as red fox, coyote, badger, long-tailed weasel (*Mustella frenata*), and striped skunk.

Orchard-Vineyard Orchard-vineyard habitat consists of cultivated fruit or nut-bearing trees and grapevines. This habitat is planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse; however, in some areas, grasses are allowed to grow between vineyard rows to reduce erosion. Wildlife species associated with vineyards include the deer mouse, mourning dove, and black-tailed hare. The nut crop from orchards provides feed for American crow, western scrub jay (*Aphelocoma californica*), northern flicker (*Colaptes auratus*), and California ground squirrel. The fruit crops from orchards provide additional food

for yellow-billed magpies (*Pica nuttalli*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), black-headed grosbeak (*Pheucticus melanocephalus*), gray squirrel (*Sciurus griseus*), raccoon (*Procyon lotor*), and mule deer (*Odocoileus hemionus*). As with all of the agricultural habitats, use of this habitat by bats would be dependent on insect availability which is limited by the use of pesticides.

Row Crops Row crops include tomatoes, sugar beets, and melons. Intensive management and the use of chemicals to control pests in row crops limit their use by wildlife. Rodent species that forage in row crops include the California vole, deer mouse, and California ground squirrel. These rodent populations are preyed on by Swainson's hawks, red-tailed hawks, American kestrels and black-shouldered kites as well as the mammalian predators, red fox, coyote, long-tailed weasel, striped skunk, and raccoon. Use of this habitat by bats would be dependent on insect availability which is limited by the use of pesticides.

Cotton Cotton is of limited value to wildlife because of the intensive management of this crop and the use of chemicals to control pests and disease. Mourning doves and house mice are found in this crop type. During irrigation when vegetation is short and sparse, additional wildlife, including American robins, white-crowned sparrows, and European starlings may forage for invertebrates. Predators that occasionally use this environment include Swainson's hawks, red-tailed hawks, American kestrels and black-shouldered kites as well as red fox, coyote, long-tailed weasel, striped skunk, and raccoon. Use of this habitat by bats would be dependent on the insect availability which is limited by the use of pesticides.

Threatened and Endangered Species

The following list was obtained on December 11, 2007, by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm (Document Number 071211120959). The list is for the following counties, which overlapped the districts in the San Luis Unit and Delta Division: Fresno, Merced, Stanislaus and San Joaquin Counties. See Table 3-2 for the species and critical habitat on the combined list for these counties (FWS 2007).

Table 3-2 List of Federal and State Listed Species that could occur in the Proposed Action Area

PLANTS

Species	Status	Habitat	*Occurrence in the Study Area
San Joaquin adobe sunburst (<i>Pseudobahia peirsonii</i>)	FT, CE	Occurs in grasslands of the western foothills of the Sierra Nevada in heavy clay soils of the Porterville, Cibo, Mt. Olive and Centerville series.	Present. CNDDDB records indicate that this species is presumed extant within Fresno County in the Round Mountain area..
Hartweg's golden sunburst (<i>Pseudobahia bahiifolia</i>)	FE, CE	Occurs in grasslands of the western foothills of the Sierra Nevada in pumice soils of the Rocklin series.	Absent. The soils in which this species occurs are absent from the study area.
hairy Orcutt grass (<i>Orcuttia pilosa</i>)	FE, CE	Vernal pools in California's Central Valley. Requires deep pools with prolonged periods of inundation.	Unlikely. Suitable habitat may be present within Stanislaus County.
San Joaquin Valley Orcutt grass (<i>Orcuttia inaequalis</i>) Critical habitat	FT, CE	Vernal pools in California's Central Valley. Requires deep pools with prolonged periods of inundation.	Absent.
succulent owl's-clover (<i>Castilleja campestris</i> ssp. <i>succulenta</i>) Critical habitat	FT, CE	Vernal pools, valley and foothill grassland.	Present. CNDDDB indicates that this species is extant at Friant and Millerton Lake in Fresno County.
Large-flowered fiddleneck (<i>Amsickia grandiflora</i>) Critical habitat	FE, CE	Cismontane woodland, valley and foothill grassland in various soils.	Possible. In undisturbed areas of San Joaquin County.
palmate-bracted bird's-beak (<i>Cordylanthus palmatus</i>)	FE, CE	Chenopod scrub, valley and foothill grassland. Restricted to seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations of less than 155 meters (500 feet). Within these areas, palmate-bracted birds-beak grows primarily along the edges of channels and drainages, with a few individuals scattered in seasonally-wet depressions, alkali scalds (barren areas with a surface crust of salts), and grassy areas.	Possible. Some suitable habitat may be present in the southwestern portion of the study area.
Colusa grass (<i>Neostapfia colusana</i>)	FT, CE	Colusa grass occurs in large or deep vernal pools with substrates of high mud content. It is sparingly restricted to the Sacramento and San Joaquin Valleys.	Possible. CNDDDB records indicate extant populations occur within Stanislaus County.
San Joaquin woolly-threads (<i>Monolopia congdonii</i>)	FE	Chenopod scrub, valley and foothill grasslands. This species is found only in the southern San Joaquin Valley and surrounding hills. It grows on neutral to subalkaline soils. On the San Joaquin Valley floor, it typically is found on sandy or sandy loam soils.	Present. CNDDDB records indicate extant populations occur within Fresno County.

California jewelflower (<i>Caulanthus californicus</i>)	FE, CE	Known populations of California jewelflower occur in nonnative grassland, upper sonoran subshrub scrub, and cismontane juniper woodland and scrub communities. Historical records suggest that it also occurred in the valley saltbush scrub community in the past. Populations have been reported from subalkaline, sandy loam soils at elevations of approximately 240 to 2,950 feet. The naturally-occurring populations known to exist today are distributed in three concentrations: (1) Santa Barbara Canyon, (2) the Carrizo Plain, and (3) the Kreyenhagen Hills in Fresno County.	Present. CNDDDB records indicate that this species is extant within Kreyenhagen Hills of Fresno County.
Keck's checker-mallow (<i>Sidalcea keckii</i>)	FE	Grows in relatively open areas on grassy slopes of the Sierra foothills in Fresno and Tulare counties.	Absent. The study area is outside of the known range of this species.
San Benito evening-primrose (<i>Camissonia benitensis</i>)	FT	Occurs largely on lands managed by the U.S. Bureau of Land Management. Its habitat consists of mostly alluvial terraces in areas of serpentine rock.	Possible. CNDDDB records indicate that this species is extant within Kreyenhagen Hills of Fresno County.
Mariposa pussypaws (<i>Calyptidium pulchellum</i>)	FT	Grows in small, barren areas on decomposed granitic sands in annual grasslands and woodlands in the southwestern foothills of the Sierra Nevada.	Possible. CNDDDB records indicate that this species is extant within Auberry of Fresno County.
Hoover's Spurge (<i>Chamaesyce hooveri</i>) Critical Habitat	FT	Vernal pools, valley and foothill grasslands	Possible. Some suitable habitat may be present in Stanislaus County.
Green's tuctoria (<i>Tuctoria greenei</i>)	FE, State Rare	Vernal pools, valley and foothill grasslands.	Absent. CNDDDB records indicate that the species has been extirpated in Stanislaus, Fresno, and San Joaquin Counties.

Invertebrates

Species	Status	Habitat	*Occurrence in the Study Area
Vernal pool tadpole shrimp (<i>Lepiderus packardii</i>) Critical habitat	FE	The vernal pool tadpole shrimp is currently distributed across the Central Valley of California and in the San Francisco Bay area. Inhabits highly turbid vernal pools.	Present. Vernal pool habitats within the study area may support populations of this species. CNDDDB records indicate that this species is presumed extant.

Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>) Critical habitat	FT	Primarily found in vernal pools, may use other seasonal wetlands.	Present. Although very little remains of the vast acreages of vernal pool habitat that once occurred in the region, some vernal pool habitats are still present. CNDDDB records indicate that this species is presumed extant in Stanislaus and San Joaquin Counties.
Longhorn fairy shrimp (<i>Branchinecta longiantemal</i>) Critical habitat	FE	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools.	Present. Vernal pool habitats within the study area may support populations of this species. CNDDDB records indicate that this species is presumed extant.
Conservancy fairy shrimp (<i>Branchinecta conservation</i>) Critical habitat	FE	vernal pool habitats. The species is currently known from several disjunct populations: the Vina Plains in Tehama County, south of Chico in Butte County, the Jepson Prairie Preserve and surrounding area in Solano County, Sacramento National Wildlife Refuge in Glenn County, Mapes Ranch west of Modesto, San Luis National Wildlife Refuge and the Haystack Mountain/Yosemite Lake area in Merced County, and two locations on the Los Padres National Forest in Ventura County.	Present. Vernal pool habitats within the study area may support populations of this species. CNDDDB records indicate that this species is presumed extant.
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra Foothills.	Present. The host plant for this species is common throughout the region. CNDDDB records indicate that this species is presumed extant.

Fish

Species	Status	Habitat	*Occurrence in the Study Area
green sturgeon (<i>Acipenser medirostris</i>)	FT	Anadromous and highly marine-oriented; spawns mainly in Sacramento River. No evidence of occurrence in San Joaquin River system. Juveniles salvaged in South Delta pumping plants in summer.	Absent. No natural waterways within the species' range will be affected by the proposed action.
Delta smelt (<i>Hypomesus transpacificus</i>)	FT	Endemic to the Delta. Found in San Joaquin River up to Mossdale in some years and in Sacramento River up to Rio Vista where salinity is 2-7 ppt.	Absent. No natural waterways within the species' range will be affected by the proposed action.
Lahontan cutthroat trout (<i>Oncorhynchus clarki henshawi</i>)	FT	Historically in all accessible cold waters of the Lahontan Basin in a wide variety of water temperatures and conditions.	Unlikely. CNDDDB records indicate that this species may occur in Fresno County at Huntington Lake.

Chinook Salmon - Sacramento River winter-run (<i>Oncorhynchus tshawytsch</i>)	FE	Spawns in Sacramento River system, but more restricted distribution than Central Valley spring-run.	Absent. No natural waterways within the species' range will be affected by the proposed action.
---	----	---	--

Amphibians & Reptiles

Species	Status	Habitat	*Occurrence in the Study Area
California tiger salamander (<i>Ambystoma californiense</i>) Critical habitat	FT	Found primarily in annual grasslands; requires vernal pools for breeding and rodent burrows for refuge.	Possible. Suitable breeding habitats in the form of vernal pools and stockponds occur in the region. Rodent burrows are common along the fringes of agricultural areas.
California red-legged frog (<i>Rana aurora draytonii</i>) Critical habitat	FE	Red-legged frogs require aquatic habitat for breeding but also use a variety of other habitat types including riparian and upland areas. Adults often utilize dense, shrubby or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of overhanging vegetation such as willows.	Present. Documented as extant with the project area.
Blunt-nosed leopard lizard (<i>Gambelia sila</i>)	FE, CE	Resident of sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. They seek cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrow.	Present. Documented as extant with Fresno County.
Alameda whipsnake (<i>Masticophis lateralis euryxanthus</i>)	FT	Restricted to valley foothill hardwood habitat of the coast ranges between Monterey and San Francisco Bay. Species inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with trees and grasses.	Absent. The study area is outside of the known range of this species.
giant garter snake (<i>Thamnophis gigas</i>)	FT, CT	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	Possible. Documented as extant within Fresno, Merced and San Joaquin Counties.

Birds

Species	Status	Habitat	*Occurrence in the Study Area
bald eagle (<i>Haliaeetus leucocephalus</i>)	FD, CE	Nests primarily in latitudes north of California into Canada and Alaska. Winters in California and forages in lakes, rivers, and grasslands.	Present. This species is known to forage during winter in deeper pools of the San Joaquin River. It may occasionally forage for ground squirrels in grasslands and pastures of the study area. Nesting habitat is absent.

California condor (<i>Gymnogyps californianus</i>)	FE	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nest sites. Forages up to 100 miles from roost/nest.	Absent. The study area is outside of the known range of this species.
--	----	--	--

Mammals

Species	Status	Habitat	*Occurrence in the Study Area
Tipton kangaroo rat (<i>Dipodomys nitratoides nitratoides</i>)	FE	Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National Wildlife Refuge, Delano, and other scattered areas within Kern County.	Possible. CNDDDB records indicate that populations (now possibly extirpated) have been detected in the southern portion of WWD. Detections were made at Tumbleweed Park on Lemoore Naval Air Station in the 1990's. Their present status is unknown. Extant populations may still be present in other parts of Westlands.
riparian woodrat (<i>Neotoma fuscipes riparia</i>)	FE, CSC	Well-developed riparian habitats along the San Joaquin and Stanislaus Rivers.	Possible. Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers.
riparian brush rabbit (<i>Sylvilagus bachmani riparius</i>)	FE, CE	Habitat for the riparian brush rabbit consists of riparian communities dominated by willow thickets (<i>Salix spp.</i>), California wild rose (<i>Rosa californica</i>), Pacific blackberry (<i>Rubus vitifolius</i>), wild grape (<i>Vitis californica</i>), Douglas' coyote bush (<i>Baccharis douglasii</i>) and various grasses. A captive breeding program is in place in certain locations along the San Joaquin River.	Possible. Only occurs in Stanislaus and San Joaquin Counties along the Stanislaus and San Joaquin Rivers.
giant kangaroo rat (<i>Dipodomys ingens</i>)	FE, CE	Annual grassland on gentle slopes of generally less than 10°, with friable, sandy-loam soils. However, most remaining populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°.	Possible. Some suitable habitats may be present in the southern portion of the study area.
San Joaquin kit fox (<i>Vulpes macrotis mutica</i>)	FE, CT	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	Present. CNDDDB records indicate that this species is presumed extant in Fresno, Merced, Stanislaus and San Joaquin Counties.

Fresno kangaroo rat (<i>Dipodomys nitratoides exilis</i>)	FE, CE	Prefers arid, alkaline plains with sparse vegetation, where it consumes seeds of annuals and shrubs, including saltbush. There are no known populations within the circumscribed historical geographic range in Merced, Madera, and Fresno Counties. A single male Fresno kangaroo rat was captured twice in autumn 1992 on the Alkali Sink Ecological Reserve, west of Fresno.	Unlikely. The study area occupies part of this species historical range. However, the absence of detections since 1992 in spite of intense survey efforts suggests that it may now be extinct.
---	--------	---	---

*Adapted from CNDDB, 2007 and USFWS list for San Joaquin, Merced, Fresno and Stanislaus Counties.

DEFINITIONS OF OCCURRENCE INDICATORS

Present: Species observed on the study area at time of field surveys or during recent past.

Likely: Species not observed on the study area, but it may reasonably be expected to occur there on a regular basis.

Possible: Species not observed on the study area, but it could occur there from time to time.

Unlikely: Species not observed on the study area, and would not be expected to occur there except, perhaps, as a transient.

Absent: Species not observed on the study area, and precluded from occurring there because habitat requirements not met.

LISTING STATUS CODES

FE: Federally Endangered

FT: Federally Threatened

FD: Federally Delisted

CE: State Endangered

CT: State Threatened

CSC: California Species of Concern

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, there would be no impacts to biological resources since conditions would remain the same as existing conditions.

Proposed Action

Affects are similar to the No Action Alternative. Most of the habitat types required by species protected by the Endangered Species Act do not occur in the project area. The Proposed Action would not involve the conversion of any land fallowed and untilled for three or more years. The Proposed Action also would not change the land use patterns of the cultivated or fallowed fields that do have some value to listed species or birds protected by the Migratory Bird Treaty Act (MBTA). Due to capacity limitations and water quality restrictions in the DMC, there would be no effects on listed fish species. No critical habitat occurs within the area affected by the Proposed Action and so none of the primary constituent elements of any critical habitat would be affected.

Transfers may occur between contractors within the same geographical areas to conduct annual transfers. It is not known at this time which, if any, transfers would occur. Future water transfers must comply with the Endangered Species Act.

The short duration of the water availability, the requirement that no native lands be converted without consultation with U.S. Fish and Wildlife Service (Service), and the stringent

requirements for transfers under applicable laws would preclude any impacts to wildlife, whether federally listed or not.

3.5 Cultural Resources

3.5.1 Affected Environment

Cultural resources is a term used to describe both ‘archaeological sites’ depicting evidence of past human use of the landscape and the ‘built environment’ which is represented in structures such as dams, roadways, and buildings. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation which outlines the Federal Government’s responsibility to cultural resources. Other applicable cultural resources laws and regulations that could apply include, but are not limited to, the Native American Graves Protection and Repatriation Act, and the Archaeological Resources Protection Act. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking listed on cultural resources on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 CFR Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office, to seek concurrence on Reclamation’s findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

The DMC is a component of the CVP which is being evaluated for the National Register. The DMC, completed in 1951, carries water southeasterly from the Tracy Pumping Plant along the west side of the San Joaquin Valley for irrigation supply, for use in the San Luis Unit, and to replace San Joaquin River water stored at Friant Dam and used in the Friant-Kern and Madera systems. The canal is about 117 miles long and terminates at the Mendota Pool, about 30 miles west of Fresno. The initial diversion capacity is 4,600 cubic feet per second (cfs), which is gradually decreased to 3,211 cfs at the terminus (Reclamation. 2007).

3.5.2 Environmental Consequences

No Action

Under the No Action Alternative, would not change nor modify the DMC and has no potential to affect historic properties pursuant to 36 CFO Part 800.3(a)(1).

Proposed Action

The Proposed Action is an administrative action that would allow for the flow of water through existing facilities to existing users. There is no ground disturbance or modification needed to the existing facilities as a result of this action nor would there be any changes in cropping patterns or urban development. As a result there is no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1). There are no impacts to cultural resources as a result of implementing the Proposed Action.

3.6 Indian Trust Assets

3.6.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," Bureau of Reclamation (Reclamation) assesses the effect of its programs on tribal trust resources and federally-recognized tribal governments. Reclamation is tasked to actively engage federally-recognized tribal governments and consult with such tribes on government-to-government level (59 Federal Register 1994) when its actions affect ITAs.

The U.S. Department of the Interior (DOI) Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI 1995). Part 512, Chapter 2 of the Departmental Manual states that it is the policy of the Department of the Interior to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members.

There are no tribes possessing legal property interests held in trust by the United States in water involved with this action, nor is there such a property interest in the lands designated to receive the water proposed in this action.

Environmental Consequences

No Action

Under the No Action Alternative there are no impacts to ITAs as there are none.

Proposed Action

As in the No Action Alternative, there are no impacts to ITAs as there are no ITAs within district service area boundaries.

3.7 Socioeconomic Resources

3.7.1 Affected Environment

The San Joaquin Valley economic region had 1,227,200 jobs in 2002, an increase of 227,300 from 1990. Government, federal, state and local, the largest employer in the economic region, totaled 254,600 jobs. Agriculture, Forestry and Fishing ranked second with 177,000 jobs. Retail Trade came in third with 131,000 jobs and Manufacturing was fourth with 109,900 jobs. Health Care and Social Assistance ranked fifth with 107,300 jobs and Accommodations and Food Services followed with 78,900 jobs. Construction and Administrative and Waste Services contributed another 114,400 to the total and Transportation and Warehousing and Other Services provided 75,600.

During the 12-year period (1990-2002) the San Joaquin Valley regional economic base grew by 227,320 net new jobs, All-government led the San Joaquin Valley economic region in job growth by adding 56,700 jobs to the economic regions job base. Health Care & Social Assistance was second adding 34,900 jobs followed by Retail Trade which added 22,400 and Accommodations & Food Services which added 21,600 jobs. Administrative & Waste Services contributed 20,900 jobs and Transportation & Warehousing added 15,000 jobs. Construction contributed another 13,300 jobs. Two of the San Joaquin Valley's traditional industries, Manufacturing and Agriculture added only 11,300 and 700 to the total, respectively and Other Services added 9,100 (California Regional Economies Project 2004).

The California Department of Finance develops population and ethnicity estimates and projections at the county level. The Hispanic community makes up a large portion of the regional population. It is estimated that over 40 percent of the regional population was identified as Hispanic in 2002.

3.7.2 Environmental Consequences

No Action

Reclamation would not approve a Warren Act Contract. Without the use of Reclamation's facilities for conveyance, new facilities may have to be constructed or other sources of water found. It is not known at this time what those facilities or sources would be. Under the No Action, there would be no adverse impacts to the quality of the human environment, public health or safety.

Proposed Action

Under the Proposed Action, participating districts would receive a small supplemental supply to their CVP water supply. Since water supply allocations have been reduced to 50 percent, Districts must find supplemental supplies in order to meet demand of agriculture production. Groundwater pump-ins from the district would help meet demand and help avoid reduction in agriculture production as a result of the dry year, but most likely additional water supplies would still be needed in order to alleviate all of the effects of the water shortage.

3.8 Environmental Justice

3.8.1 Affected Environment

Executive Order 12898, dated February 11, 1994, requires Federal agencies to ensure that their actions do not disproportionately impact minority and disadvantaged populations. The population of some small communities typically increases during late summer harvest. The market for seasonal workers on local farms draws thousands of migrant workers, commonly of Hispanic origin from Mexico and Central America.

3.8.2 Environmental Consequences

No Action

Under the No Action Alternative, Reclamation would not approve a Warren Act Contract. Without the use of Reclamation's facilities for conveyance, new facilities may have to be constructed or other sources of water found. It is not known at this time what those facilities or sources would be. Current employment and housing trends would remain unchanged in the service area with the No Action Alternative.

Proposed Action

Implementing the Proposed Action would not cause any harm to minority or disadvantaged populations within the project area. A Warren Act Contract would allow the water districts to use their non-CVP water for irrigation in their service area. The availability of this water would help maintain agricultural production and local employment if 2008 is a dry year.

3.9 Cumulative Impacts

Reclamation's action is the conveyance of non-CVP water to the DMC. Subsequent actions are beyond Reclamation's approval and authority. Reclamation has made Warren Act Contracts available in previous years whether it was a dry year or not. Most likely in 2008, more Districts will be requesting Warren Act Contracts since it may be a dry year and groundwater is a potential supplement to the reduced CVP supply. This is a one-year action, and the cumulative amount the districts are limited to under this project is 50,000 AF. However, Districts can request a Warren Act Contract separate from this project for up to 10,000 AF of non-CVP water, but this action would be analyzed in a separate environmental document. Additionally, in accordance with the Warren Act, Reclamation would continue to make these contracts available to requesting districts in future years, given that each district meets present and future requirements for Warren Act Contracts.

Agricultural run-off and groundwater pump-in would have cumulative water quality effects to the Mendota Pool; however, the Contracting Officer would terminate conveyance should water quality exceed State water quality standards.

There would be no long-term cumulative effects as a result of the Proposed Action.

Section 4 Consultation and Coordination

4.1 Fish and Wildlife Coordination Act (16 USC . 651 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The implementation of the CVPIA, of which this action is a part, has been jointly analyzed by Reclamation and Service and is being jointly implemented. The Proposed Action does not involve construction projects. Therefore, the FWCA does not apply.

4.2 Endangered Species Act (16 USC. 1521 et seq.)

Section 7 of this Act requires Federal agencies to ensure that all federally associated activities within the United States do not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of the critical habitat of these species. Reclamation has determined that the Proposed Action would have no affect on federally listed threatened and endangered species or their federally listed critical habitats.

4.3 National Historic Preservation Act (15 USC 470 et seq.)

The NHPA of 1966, as amended (16 USC 470 *et seq.*), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, properties that are eligible for inclusion in the National Register of Historic Places. The 36 CFR Part 800 regulations implement Section 106 of the NHPA.

Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the area of potential effects APE, conduct cultural resource inventories, determine if historic properties are present within the APE, and assess affects on any identified historic properties. No construction, new land use, or new ground disturbing activities would occur as a result of the Proposed Action. Therefore, the Proposed Action has no potential to affect historic properties (36 CFR 800.3(a)(1)).

4.4 Migratory Bird Treaty Act (16 USC Sec. 703 et seq.)

The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or

product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action would have no effect on birds protected by the MBTA.

4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990 - Protection of Wetlands

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands. This action would not adversely affect floodplains or wetlands.

Section 6 List of Preparers and Reviewers

Patti Clinton, Natural Resource Specialist, SCCAO

Sheryl Carter, Repayment Specialist, SCCAO

Chris Eacock, Natural Resource Specialist, SCCAO

Judi Tapia, Natural Resource Specialist, SCCAO

Shauna McDonald, Wildlife Biologist, SCCAO

Eileen Jones, Repayment Specialist, SCCAO-TO

Adam Nickels, Archaeologist, MP

Frances Mizuno, San Luis & Delta Mendota Water Authority

Section 7 References

Belitz, K. and F.J. Helmes. 1990. Character and Evolution of the Ground-Water Flow System in the Central Part of the Western San Joaquin Valley, California. U.S. Geological Survey Water-Supply paper 2348

Bertoldi, G.L., R.M.H. Johnson, and K.D. Evenson. 1991. Ground Water in the Central Valley, California - A Summary Report. U.S. Geological Survey Professional Paper 1401-A.

California Regional Economies Project. 2004. *San Joaquin Valley Economic Base Report*.

Prepared by J.K. Inc. <http://www.labor.ca.gov/panel/pdf/espcrepprodsjvebr.pdf>

City of Tracy. 2007. website -

http://www.ci.tracy.ca.us/city_council/meetings/agendas/2005/08/02/01b.pdf

DWR. 2007. California Department of Water Resources, April 16, 2007. San Joaquin Valley Water Year Type Index. <http://cdec.water.ca.gov/cgi-progs/iodir/WSI>

DWR. 2003. California's Ground Water, Bulletin 118-update 2003.

- DWR. 1977. Kern County Groundwater Model District Report.
- DWR. 1994. The California Water Plan Update. Bulletin 160-93
- Ireland, R.L., J.F. Poland, and F.S. Riley. 1982. Land Subsidence in the San Joaquin Valley as of 1980. U.S. Geological Survey Professional Paper 437-1
- San Joaquin Valley Drainage Program. 1990. *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley. Final Report of the San Joaquin Valley Drainage Program.* U.S. Department of the Interior and California Resources Agency
- California State Senate. 2007. website - http://info.sen.ca.gov/pub/05-06/bill/asm/ab_0251-0300/ab_286_cfa_20050610_090407_sen_comm.html
- Tetra Tech. 2000. *Draft EA for Eastside/Westside Water Transfer/Exchange.* Prepared for U.S. Bureau of Reclamation June 16, 2000.
- U.S. Census Bureau 2000. Census information for the County of Fresno, CA
- U.S. Reclamation. 2005. *Environmental Assessment, Long-Term Contract Renewal, Delta Mendota Canal Unit, Central Valley Project, Sacramento, CA.* February 2005.
- U.S. Bureau of Reclamation. 2005b. *2005 San Luis Public Draft Central Valley Project, West San Joaquin Division, San Luis Unit Long-Term Water Service Contract Renewal Environmental Impact Statement.* 2005
- U.S. Reclamation. 2007. website – <http://www.usbr.gov/dataweb/html/delta.html#general>.
- U.S. Reclamation. 2007b. *San Luis & Delta-Mendota Water Authority and San Joaquin River Exchange Contractors Water Authority Substitute Water Exchange Environmental Assessment.*